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CENTRAL INTELLIGENCE AGENCY

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COUNTRY USSR (Kuybyshevskaya Oblast) REPORT 25X1

SUBJECT Development of Materials at the Krasnaya Glinka Aircraft Plant DATE DISTR. 28 May 1958

NO. PAGES 1

REFERENCES RD

DATE OF INFO. 25X1

PLACE & DATE ACQ. 25X1

SOURCE EVALUATIONS ARE DEFINITIVE. APPRAISAL OF CONTENT IS TENTATIVE.

reports on Aircraft Engine Experimental Plant No. 2 in Krasnaya Glinka N 53-21, E 50-11. The first report deals with the raw materials being developed at this plant, including high-temperature alloys for turbine-blade material. The second report describes material for engine discs and discusses the durability of the turbine-blades. Both reports are highly technical.

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Washington distribution indicated by "X"; Field distribution by "#".

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Raw Material Shortages at Plant No 2 in Upravlencheskiy x

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"

Turbine-blade material: For each delivered bar there are 6 specimens for tensile strength tests at 20 degrees, and 3 specimens each for creep tests at 800 degrees, as well as one disk about 15-mm thick for microscopic examination.

Disk material: 6 tensile-test specimens (3 for σ_B and 3 for $\sigma_{0.2/100}$ at 650 degrees, later 700 degrees), 3 notched-bar impact-test specimens (longitudinal and transverse) in accordance with proscribed heat-treatment. Structural examinations.

"First desired values, for example, for $\Sigma M 388$ a creep strength at 800 degrees $\sigma_B 100^h \geq 12 \text{ kg/mm}^2$. Several months later came the delivery of the first bars, which did not show 12 kg/mm^2 at 800 degrees. The required thermal stability of $\sigma_B / 800 \approx 45 \text{ kg/mm}^2$ was attained."

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[REDACTED]

"The use of material being developed was decided by the chief metallurgist, Polyakov, after tensile tests at 20 degrees and 800 degrees, and creep strength tests at 800 degrees for 100 hours. There were also age-hardening tests, for example: 16^h at 850 degrees, and appraisal of the carbide distribution at the grain boundaries (perlitic structure)."

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[REDACTED]

The performances of the engine and the time until the first check of the blades for pitting were decreased."

[REDACTED]

[REDACTED]

about 8 kg/mm² in the case of the TL-014, but no further information is definite."

[REDACTED]

"Precision-casting experiments (wax forms) were carried out with an alloy similar to vitallium."

[REDACTED]

Experimental alloys have continuous numbers."

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[REDACTED]

[REDACTED]

"The gentlemen from VIAM made a good impression, and those from Plant No 2 (Polyakov, Popov) made an extremely poor impression. This is true of Popov, even though he received the Stalin Prize for the introduction of the continuous-casting method for light metals."

[REDACTED]

"The purpose was to get their own engine, since the Rolls-Royce 'Nema' incurred considerable difficulty."

[REDACTED]

[REDACTED] (VIAM). Learned from conversations that there is a Vickers creep-test installation there, as well as a 'Losenhausen' (2 tons)."

[REDACTED]

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"Experiments on the further development of the BMW 003 C were discontinued because of the complicated manufacture."

[REDACTED]

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[REDACTED]

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Test data were in the possession of the chief metallurgist and were only occasionally, in the case of discrepancies, accessible."

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"Vatallium was known as an alloy, but was not used for turbine blades."

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at the beginning, since the forging of large disks was difficult, and cracks were often discovered (up to 50% rejects)."

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Experimental melts (for comparison with VIAM regarding creep data) much earlier."

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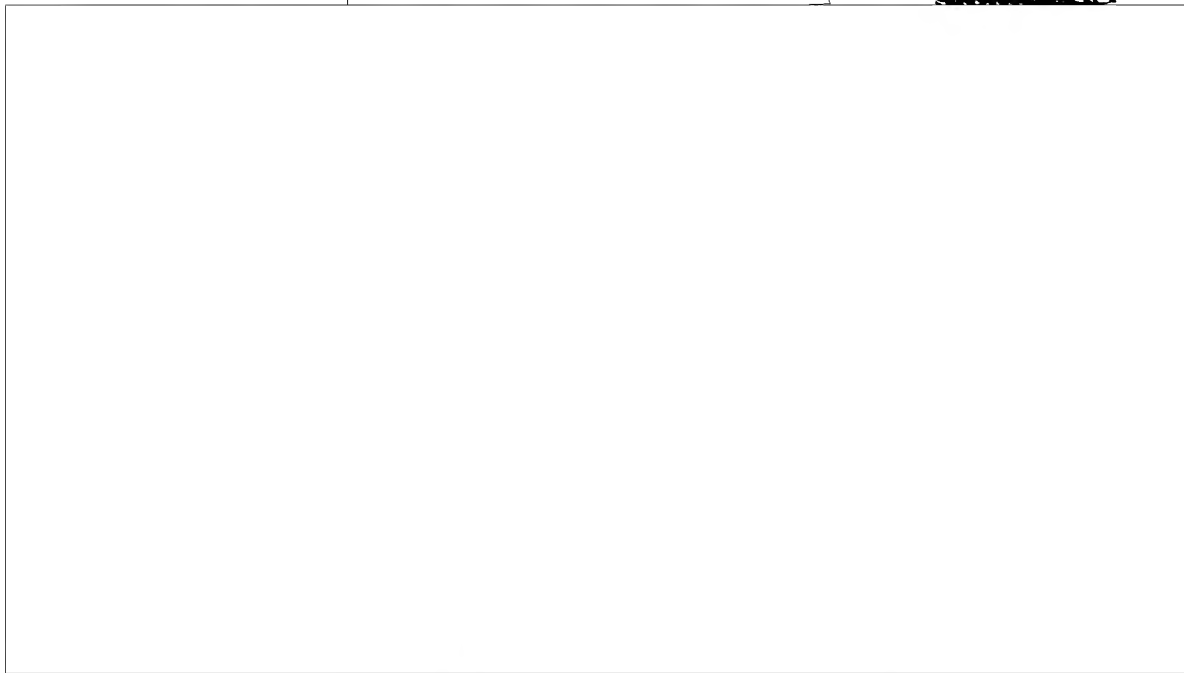
"Creep strength was not tested, only long-time creep strength

$\sigma_{B/100h}$ 800° and later $\sigma_{B/100h}$ 850°. The permanent elongation was not supposed to exceed about 1%. Bending strength was not tested. Time yield limit for disk material σ 0.2/100 at 650° and 700°."

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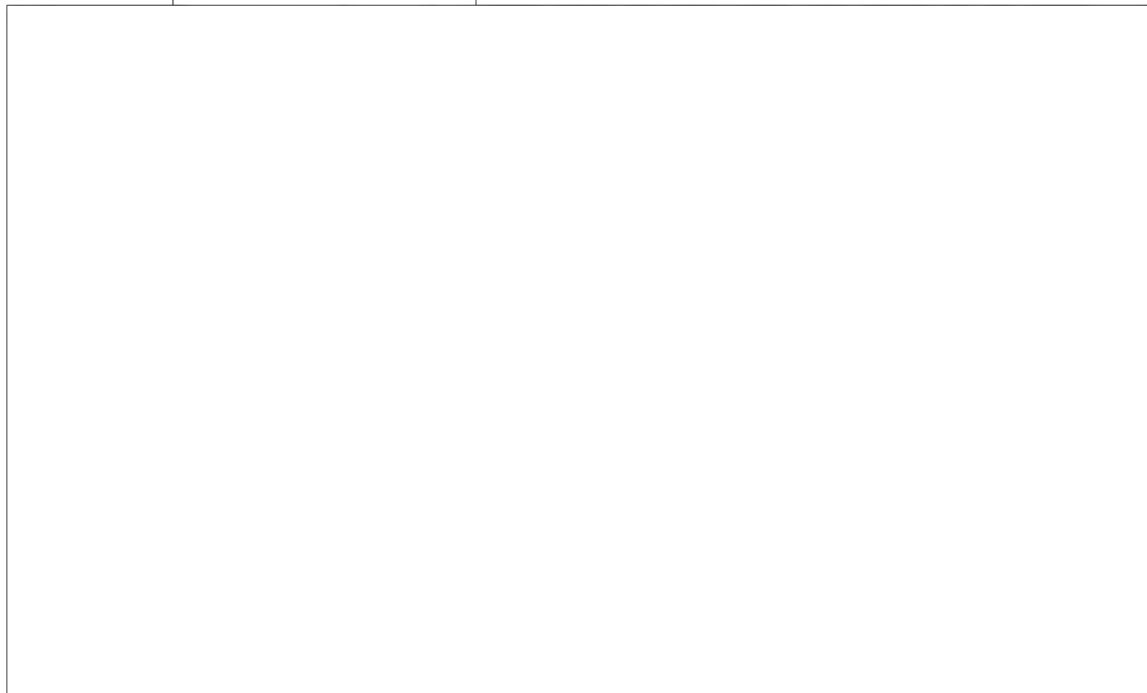
"In VIAM experiments on the production of titanium were being carried out. [redacted]"

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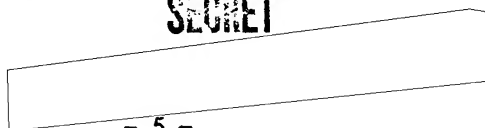
"The Soviets mentioned that work of this type was going on in VIAM. [redacted]"

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"Experiments on turbine blades with aliting, chroming and nickel plating; process, however, not ultimately introduced."

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model blades were exhibited around 1952."

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" EN 388 is blade material. It is possible that it was used as disk material in experiments. This must have been about 1950, since FKDM/O was no longer satisfactory."

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"45-48 kg/mm² tensile strength at elevated temperature, therefore fractured at 800 degrees centigrade. The mere heating to 800 degrees causes recrystallization. 1948/49 "

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"The blades were supposed to have a service life of 100 hours. It was hoped that this could be extended to 500 hours with the same performances. Up until the time I left, the blades were being replaced after 100 hours."

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"Some wheels ran through several exchanges, until the
journal rds showed cracks." 1949/1950

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